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## IMAGES ARE BEST AVAILABLE COPY.

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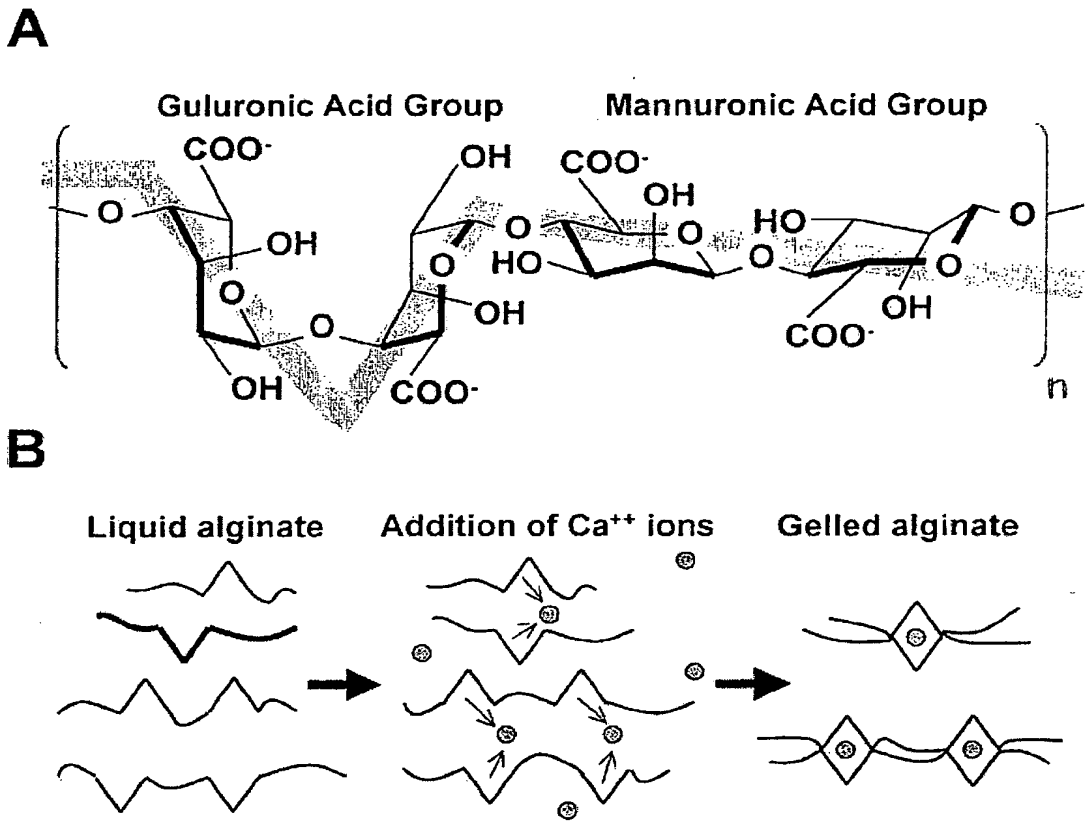
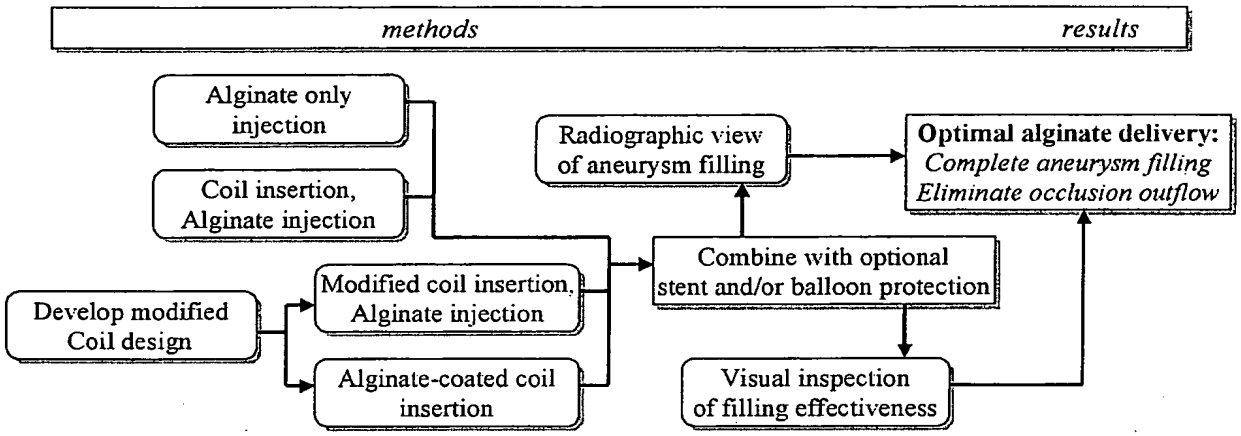


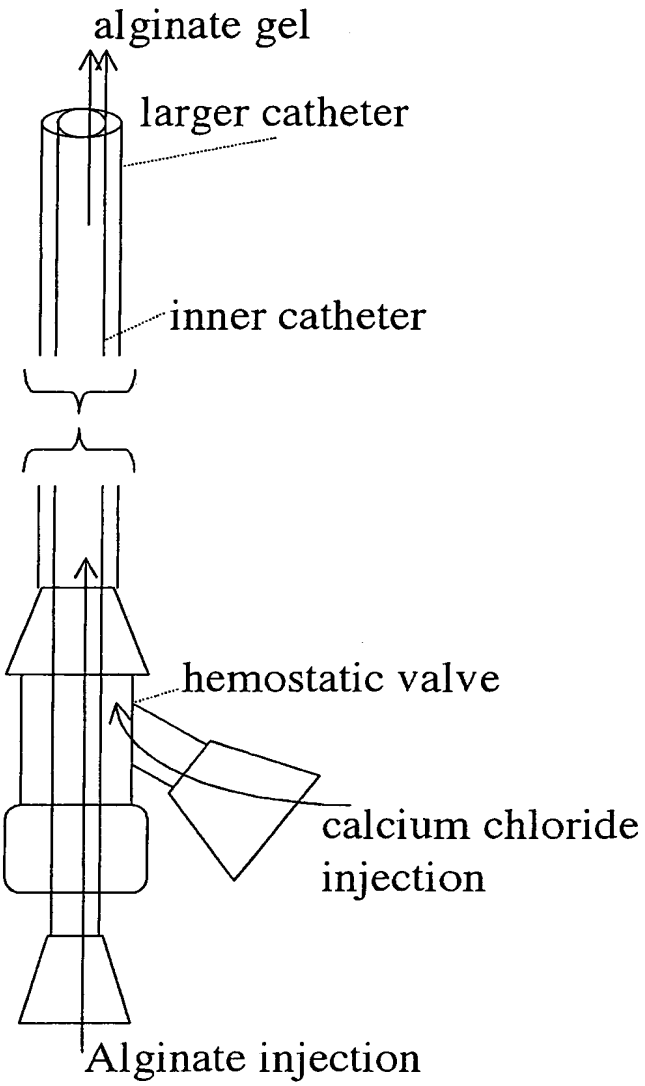

Alginate structure and reaction mechanism. (A) Alginate is a polysaccharide copolymer made of guluronic (G) and mannuronic (M) acid groups. The stereochemistry of the G acid provides reactive carboxylic acid sites. The M acids are not reactive. (B) In the presence of divalent calcium ions, the calcium is ionically substituted at the carboxylic site. A second alginate strand can also connect at the calcium ion, forming a link in which the Ca ion attaches two alginate strands together. The result is a chain of calcium linked alginate strands that form a solid gel.

**Figure 1.**



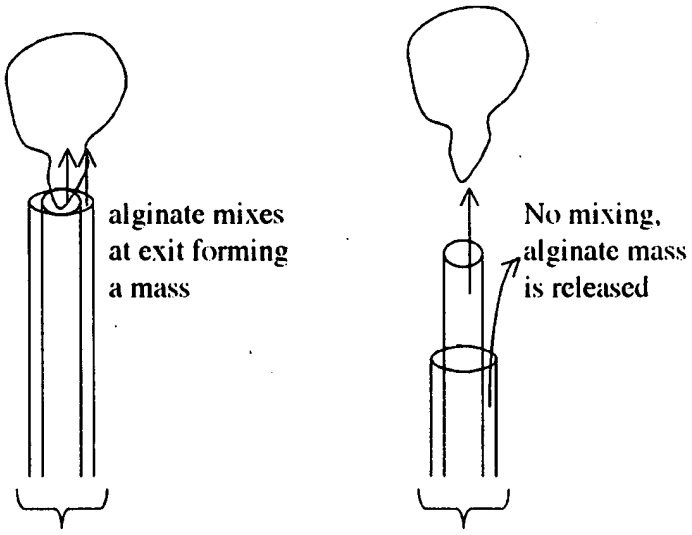

Flow diagram summary of alginate and coil occlusion options

**Figure 2.**



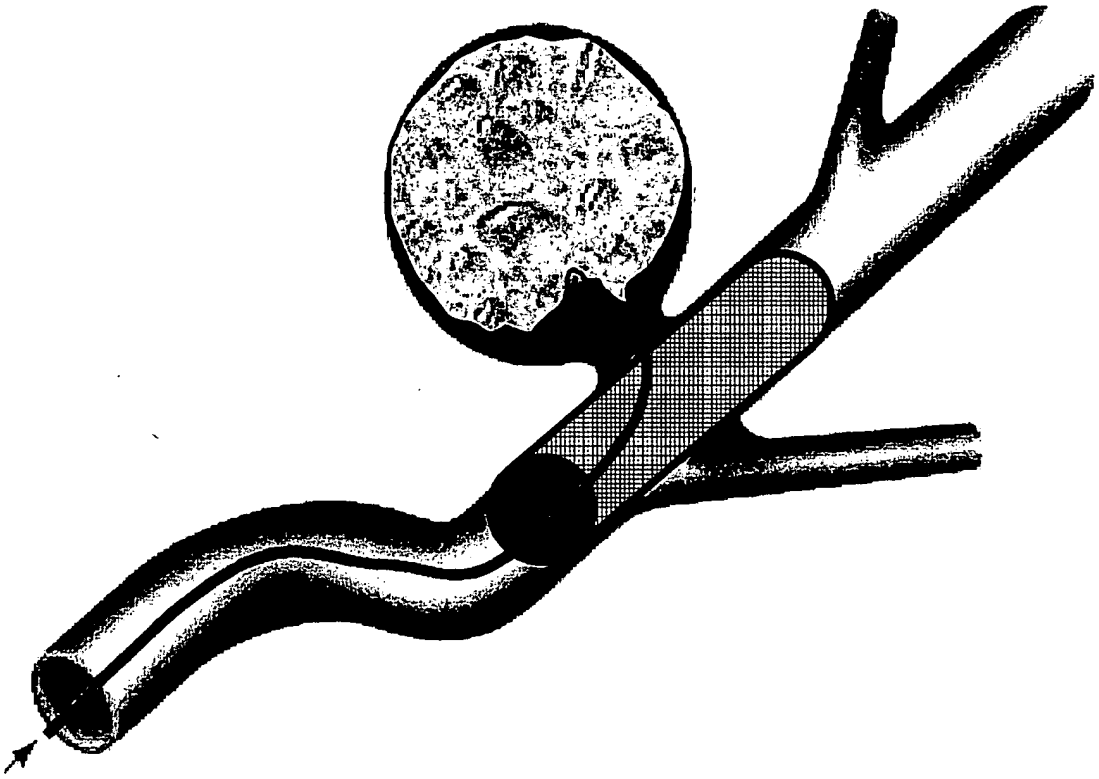

Concentric tube catheter design that improves control of alginate injection

**Figure 3.**



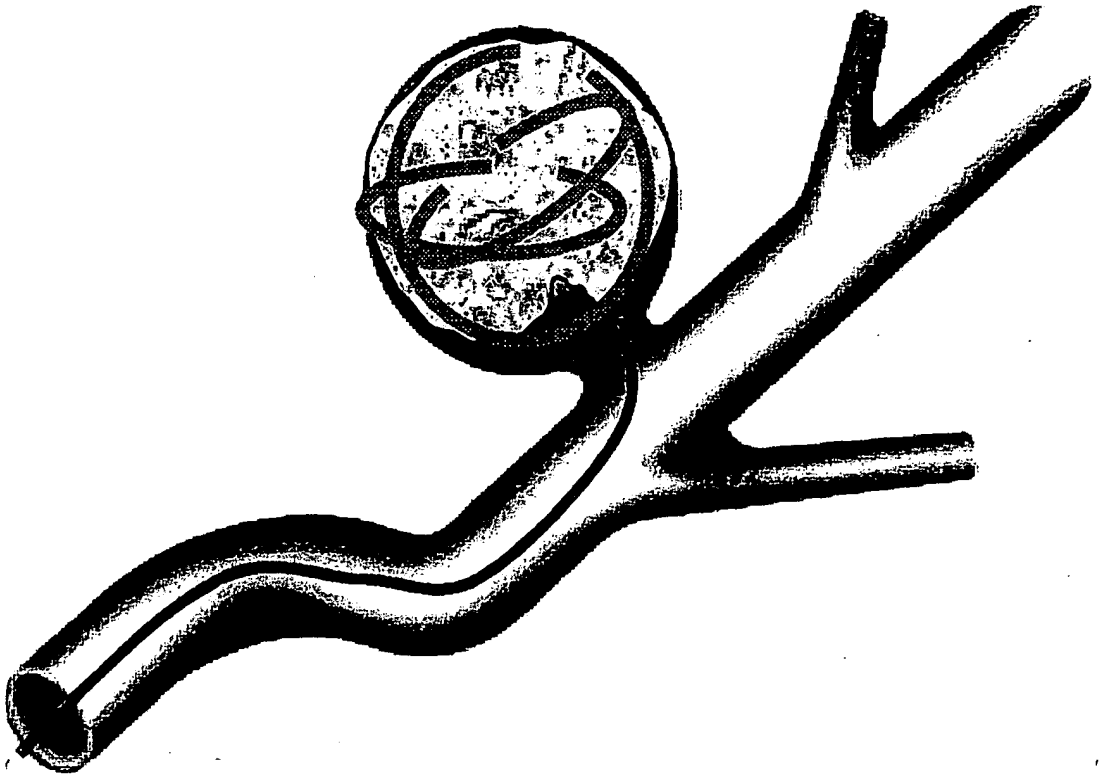

a) alginate mass formation b) release of alginate mass/strand

**Figure 4.**



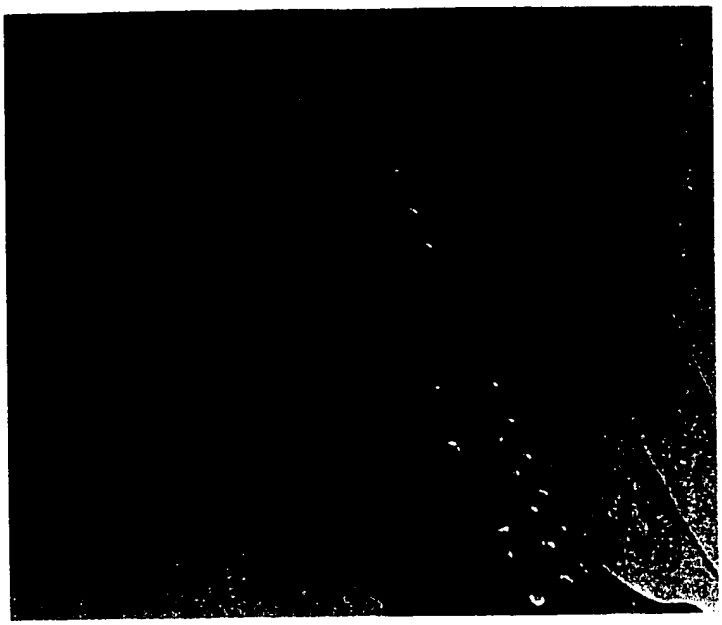
Stent placement and alginate injection to completely fill the aneurysm

**Figure 5.**



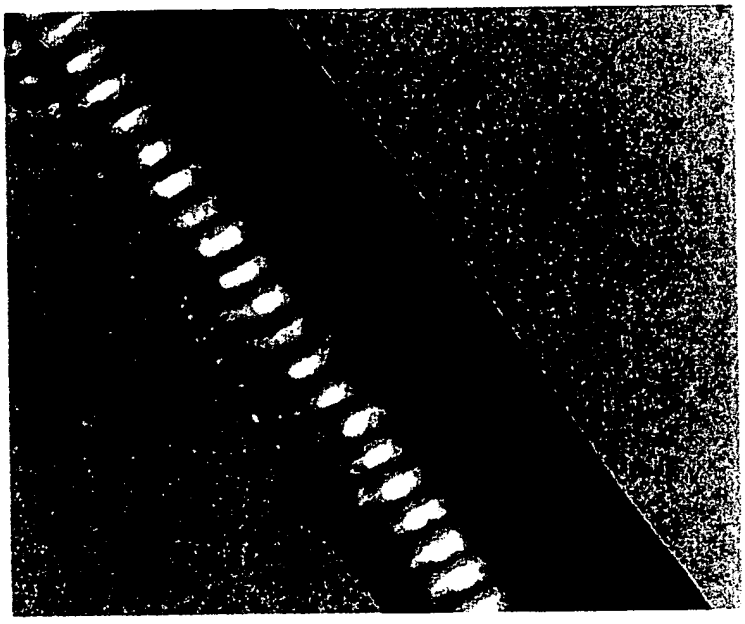
Partial aneurysm filling with coils, complete filling of remaining volume with alginate

**Figure 6.**



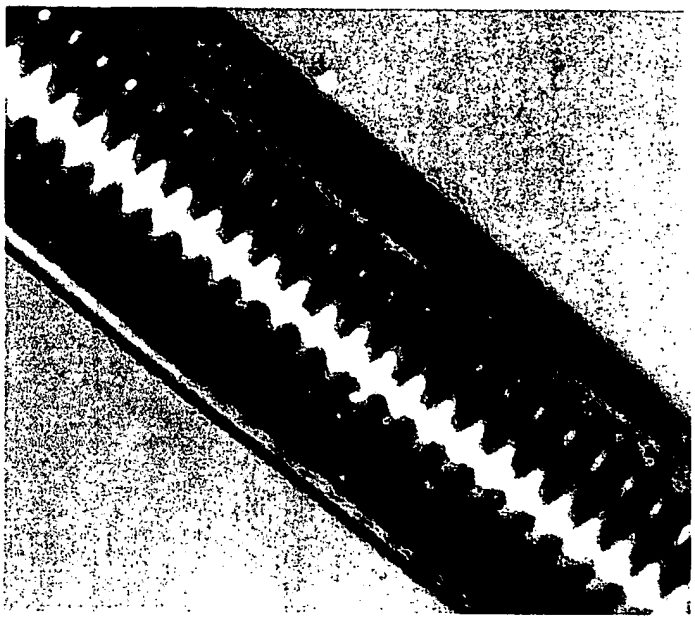
Alginate coated coil, 3X diameter increase

**Figure 7A.**



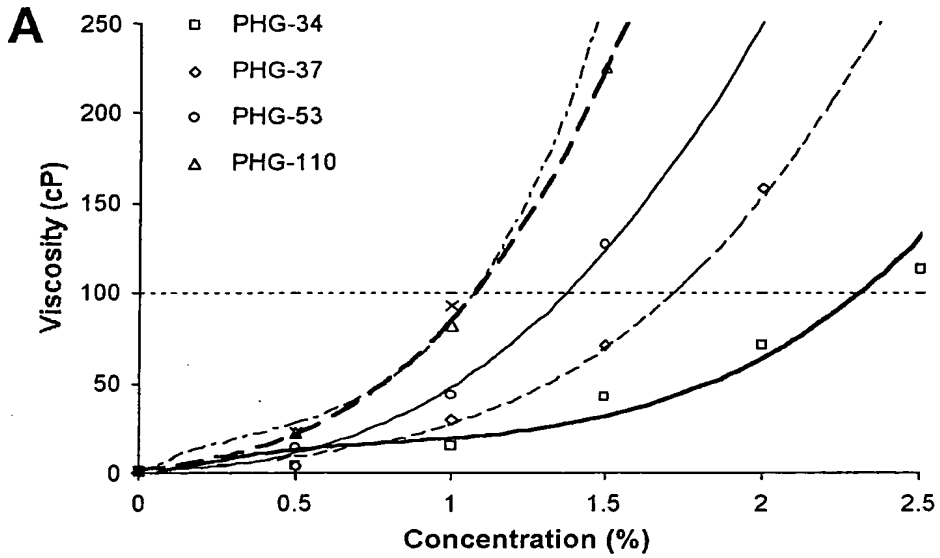
Dehydrated coil, 1.08X

**Figure 7B.**



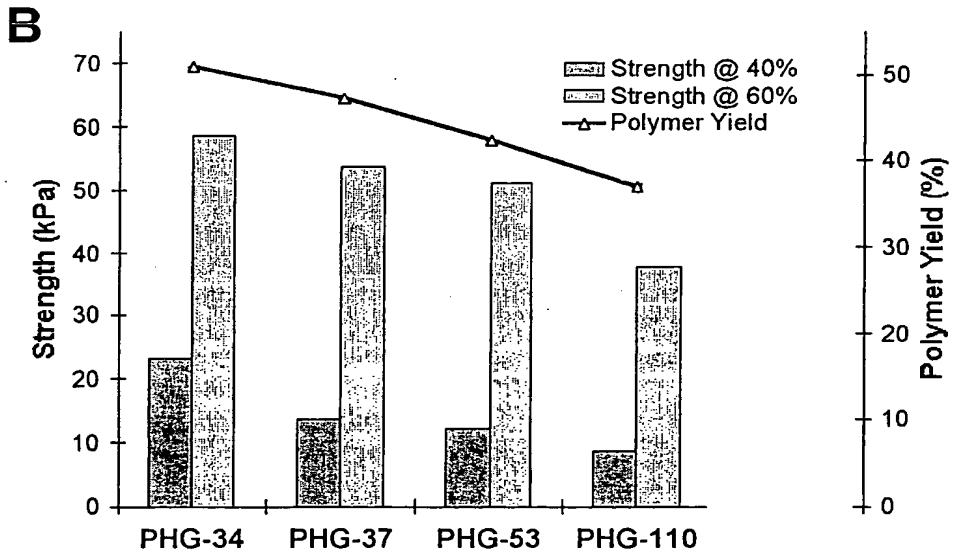
Rehydrated 5 minutes, 1.7X

**Figure 7C.**



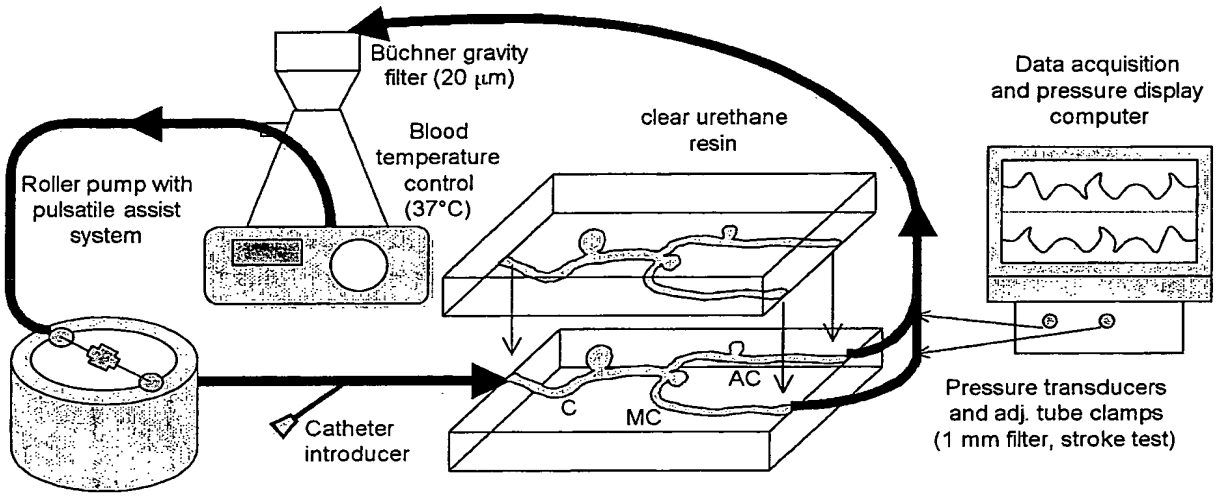

Viscosity versus concentration of various aliginate molecular weights (apparent viscosities)

**Figure 8A.**



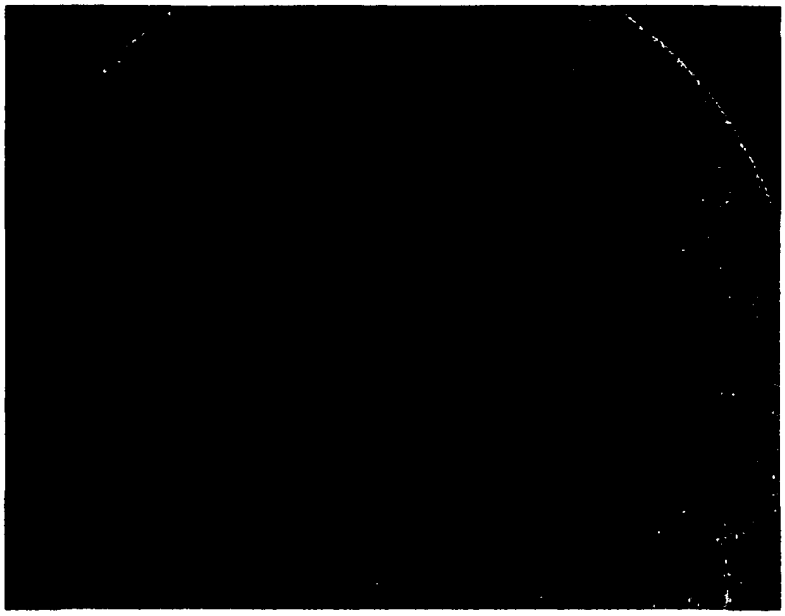

Alginate strength and polymer yield versus various alginate molecular weights (apparent viscosities)

**Figure 8B.**



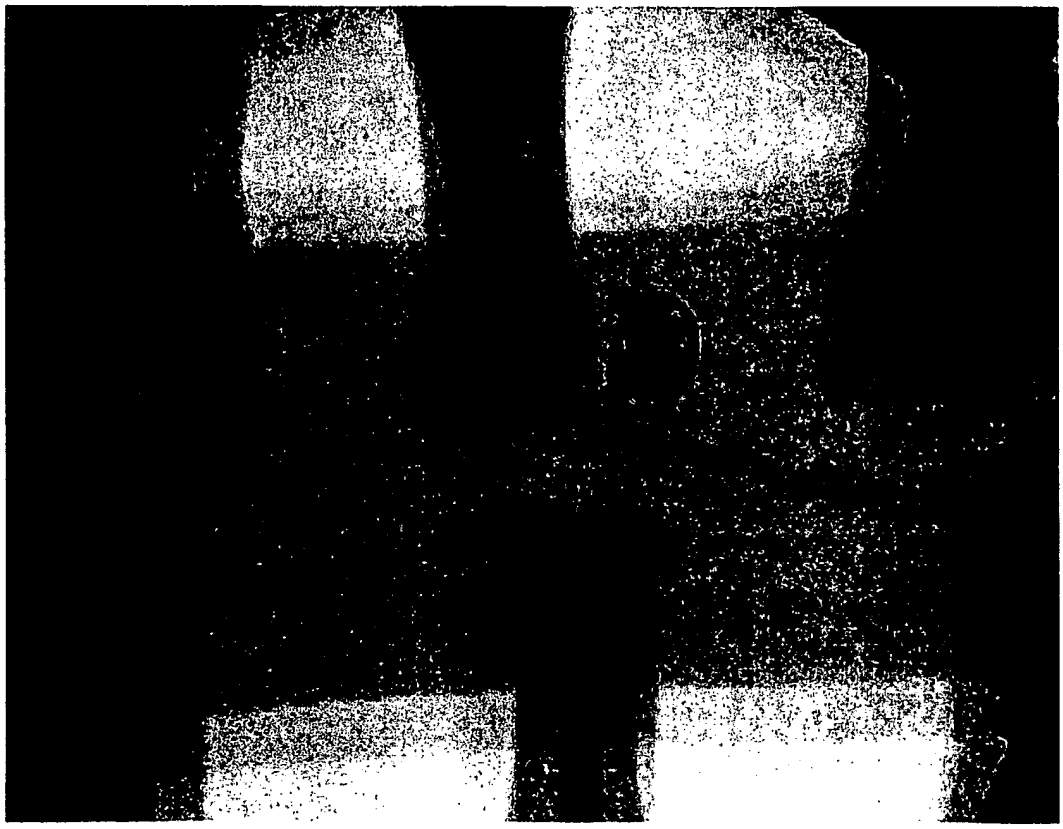

*In vitro* vessel cast aneurysm model setup

**Figure 9.**



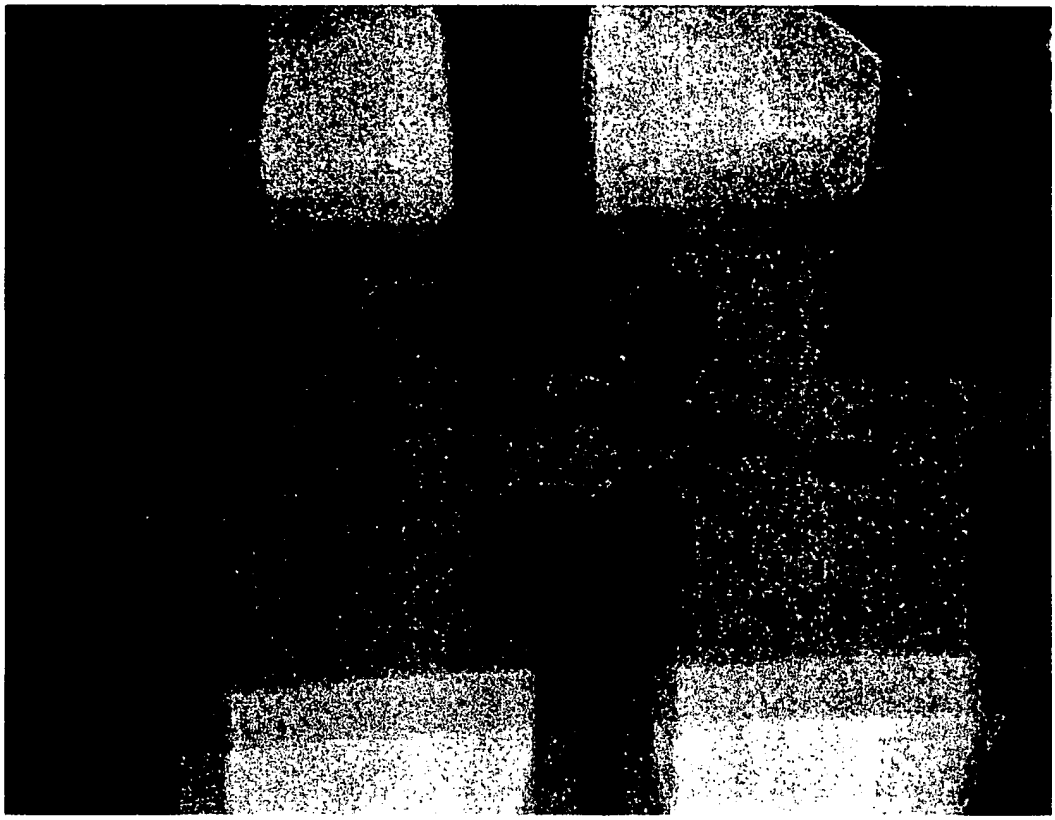
Pre-embolization of a small-neck aneurysm

**Figure 10A.**



Coil delivery, partial aneurysm filling, < 5% of vol.

**Figure 10B.**

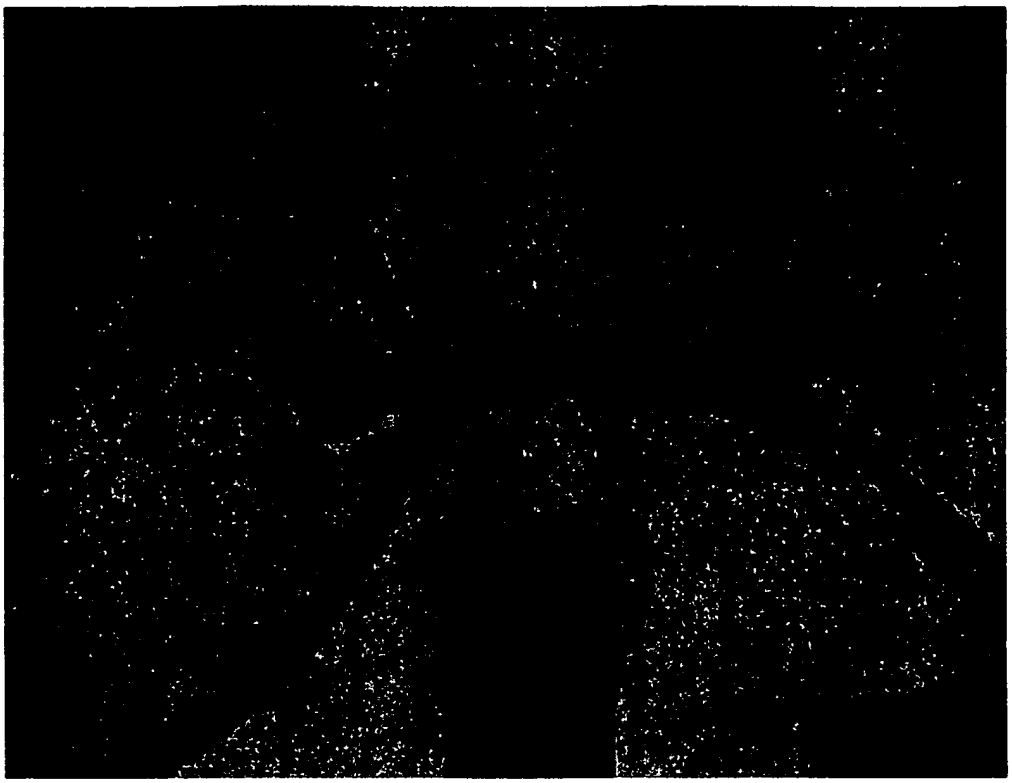


Alginate filling of remaining aneurysm volume, 90-100% of vol.

**Figure 10C.**

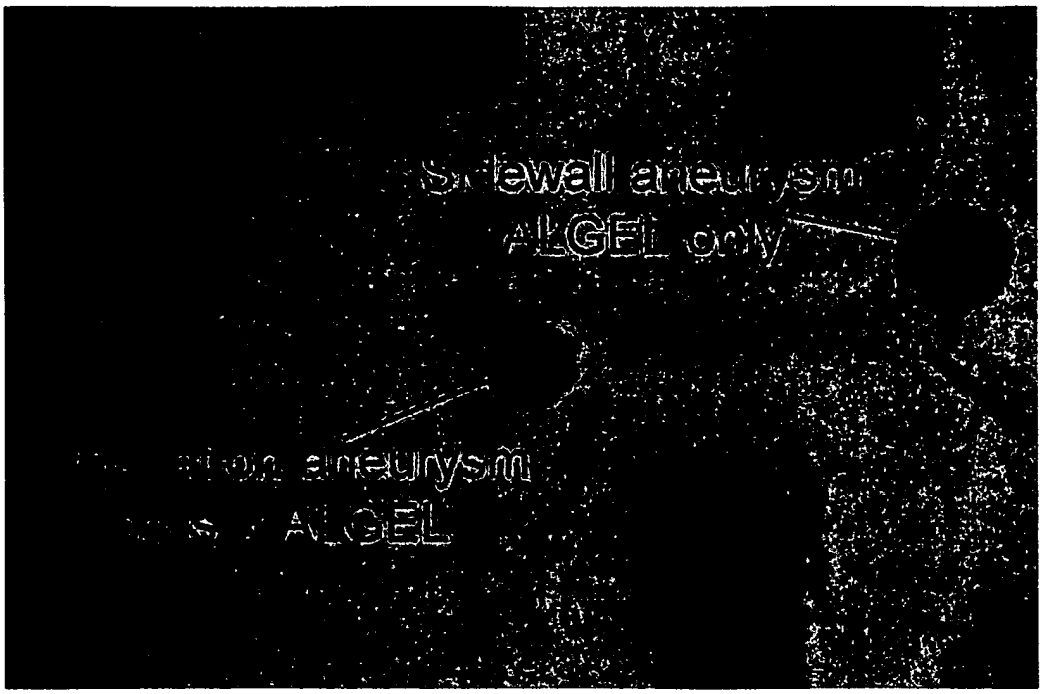
Post-embolization, complete aneurysm filling

**Figure 10D.**



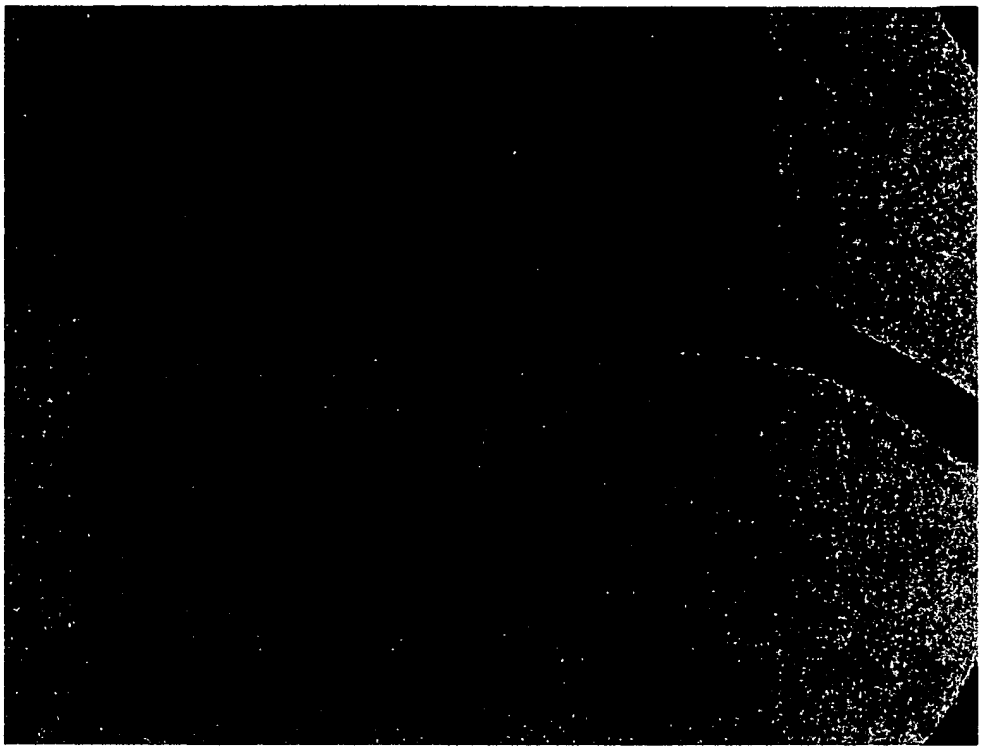
Pre-embolization

**Figure 11A.**



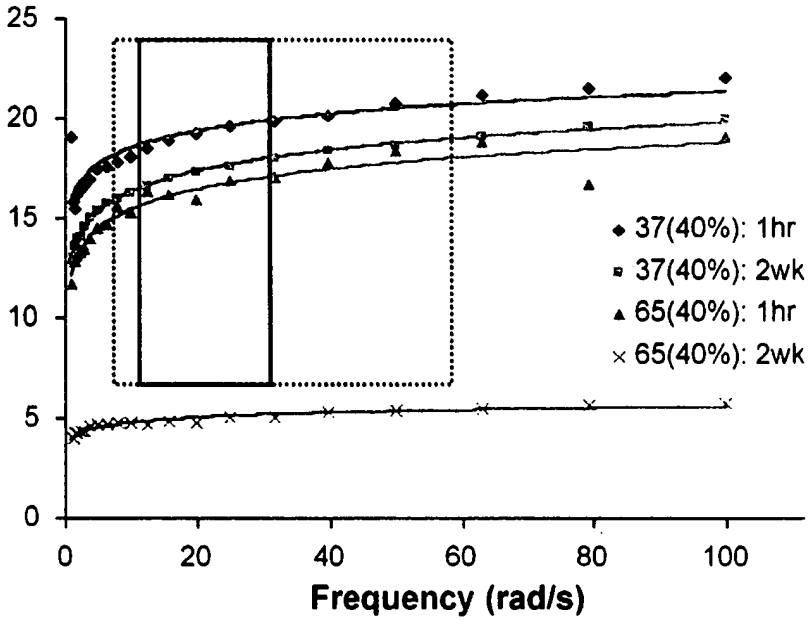

Addition of unmodified coils and alginate

**Figure 11B.**



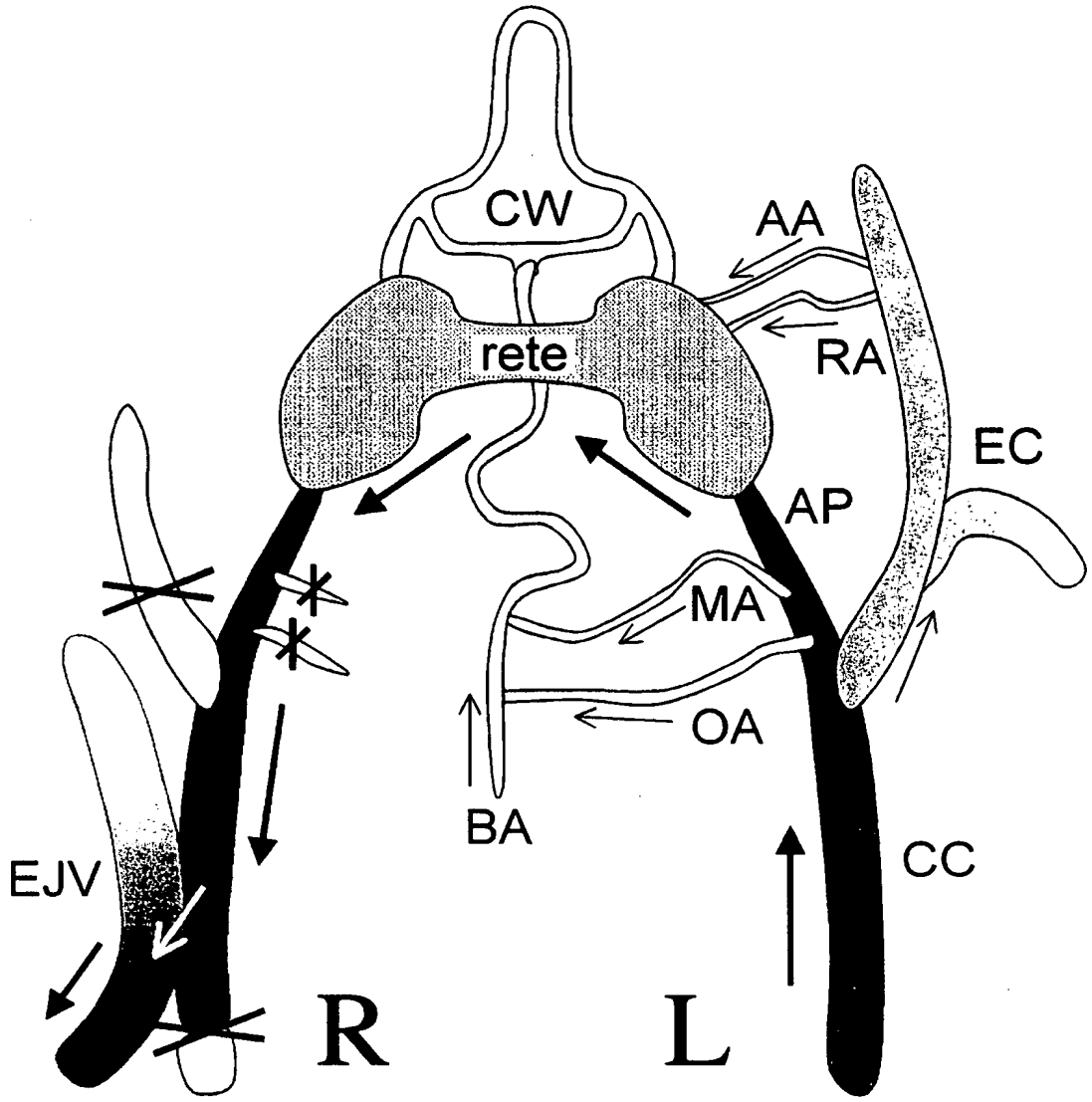
Post-embolization complete occlusion

**Figure 11C.**



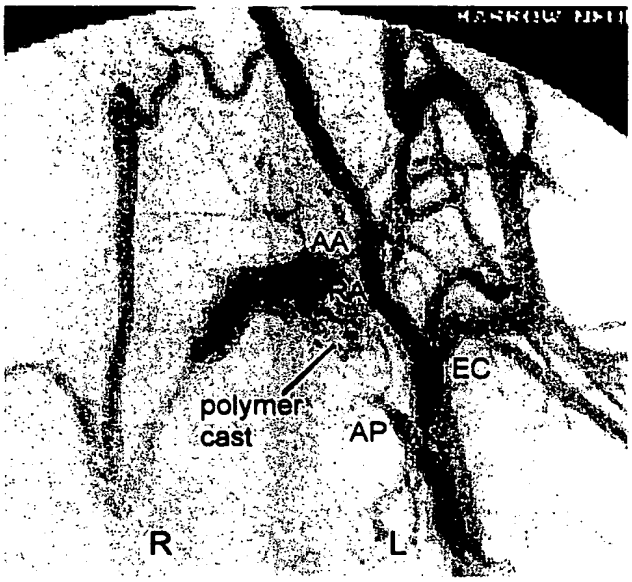

Mechanical stability of high and low molecular weight alginate and change over 2 weeks in in vitro aneurysm model

**Figure 12.**



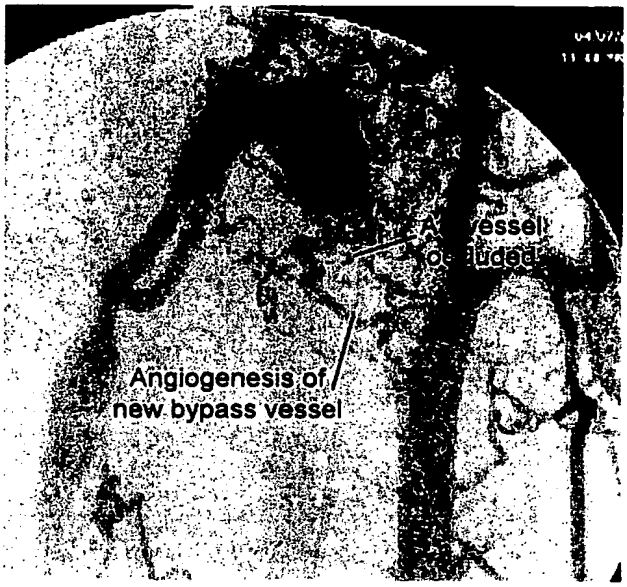

Swine rete mirabile structure and anastomosis procedure

**Figure 13.**




Flow immediately after occlusion. Flow in the AP vessel is stopped, yet the AA and RA vessels maintain flow to the RM and CW.

**Figure 14.**

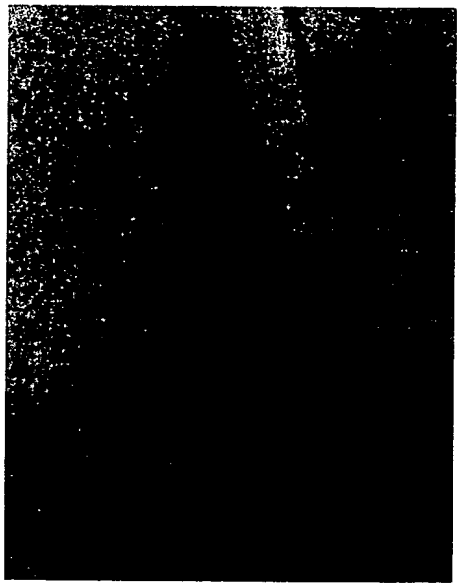



AP occlusion sustained after 6 months. Image shows signs of angiogenesis, a new vessel has formed to feed the base of the RM

**Figure 15.**

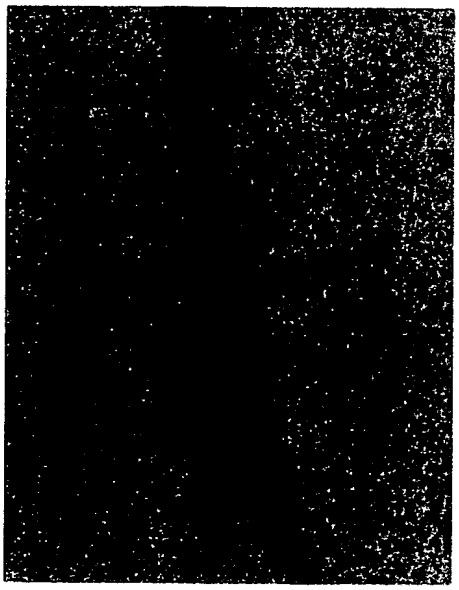
Pre-embolization of in vivo aneurysm model

**Figure 16A.**



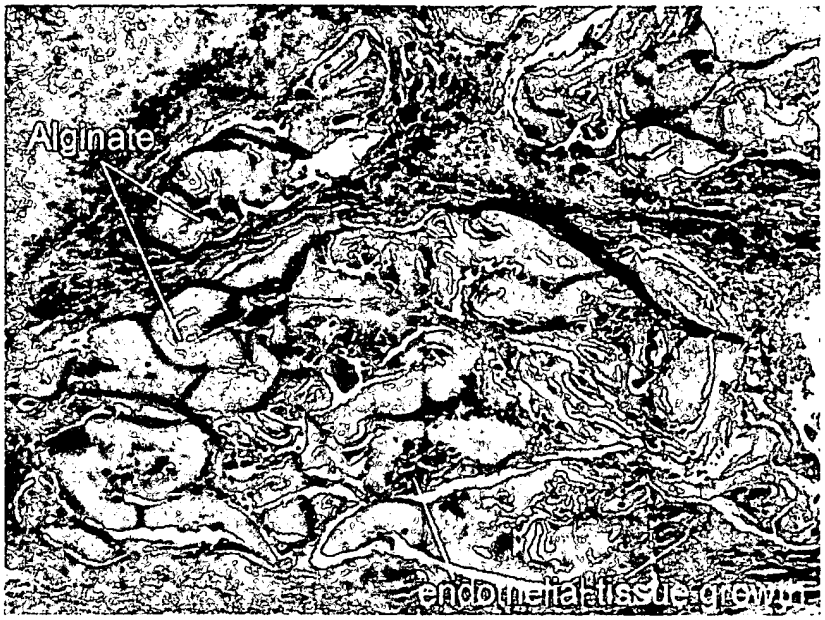
Alginate occlusion with balloon protection to completely fill the aneurysm sac

**Figure 16B.**



Post-embolization, complete occlusion of aneurysm with no parent vessel occlusion

**Figure 16C.**




Alginate occlusion in the RM after six months. Tissue encapsulation and endothelial growth surrounds and penetrates the gel.

**Figure 17.**